

**EFFECT OF INOCULUM RATIO ON MOLASSES-BASED
DISTILLERY WASTEWATER TOWARDS BIOGAS
PRODUCTION VIA ANAEROBIC DIGESTION APPROACH**

By

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AUTHOR'S DECLARATION

I declare that the work in this report was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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TABLE OF CONTENTS

| | PAGE |
|---|-------------|
| AUTHOR'S DECLARATION | i |
| SUPERVISOR'S CERTIFICATION | ii |
| COORDINATOR'S CERTIFICATION | iii |
| ACKNOWLEDGEMENT | iv |
| TABLE OF CONTENTS | v |
| LIST OF TABLES | vii |
| LIST OF FIGURES | viii |
| LIST OF ABBREVIATIONS | ix |
| ABSTRACT | x |
| | |
| CHAPTER ONE INTRODUCTION | 1 |
| 1.1 Research Background | 1 |
| 1.2 Problem Statement | 2 |
| 1.3 Objectives | 3 |
| 1.4 Scope of Work | 3 |
| | |
| CHAPTER TWO | 4 |
| 2.1 Origin of Molasses-based Distillery Wastewater | 4 |
| 2.2 Characteristics of Molasses-based Distillery Wastewater | 5 |
| 2.3 Biogas Production via Anaerobic Digestion | 6 |
| 2.4 Waste Materials used as Biogas Feedstocks | 6 |
| 2.5 Anaerobic Digestion Parameters | 9 |
| 2.6 Inoculum used in Biogas Production | 9 |
| 2.7 Biogas Characteristics | 10 |
| | |
| CHAPTER THREE RESEARCH METHODOLOGY | 12 |
| 3.1 Introduction | 12 |
| 3.2 Chemicals and Materials | 12 |
| 3.3 Flowchart | 12 |

ABSTRACT

Molasses-based distillery wastewater (MDW) is categorized as high-strength for its high content of COD and BOD. This wastewater would threaten the environment if it were to be discharged without being treated properly. Therefore, it is important to find the most suitable treatment method that has the qualities of being low cost, economically and environmentally friendly that meet the current technology availability. Hence, studies done, and it is found that anaerobic digestion method possesses those criteria. **Anaerobic digestion is a biological treatment method that converts biodegradable matter into green energy alternative called biogas.** However, since different types of feedstocks give different biogas yield, it is important to understand the nature of the process to gain the result of the highest biogas yield. This study comes with the objectives of studying the effect of inoculum towards biogas production from molasses-based distillery wastewater via anaerobic digestion method and analysing the biochemical properties of biogas produced from molasses-based distillery wastewater. The MDW underwent anaerobic digestion process using a reactor functioning based on the CSTR system to produce biogas and the methane content of the biogas was analysed. Several methodologies on determining the parameters of biogas production had been conducted including the determination of COD, BOD, pH analysis, total solids analysis. **The molasses-based distillery wastewater was mixed 1:1 ratio between diluted molasses-based distillery wastewater and inoculum.** Biogas production was done with the operating condition within the thermophilic condition in a closed batch digester. After 48 hours, the biogas production was considered done and were compared to an existing study. Sample experimented in this study indicated significant low biogas yield than expected which is 0.02 %. Further work needs to be done to learn the pattern of biogas yield with different ratio of inoculum.